

FIG. 1 (PRIOR ART)

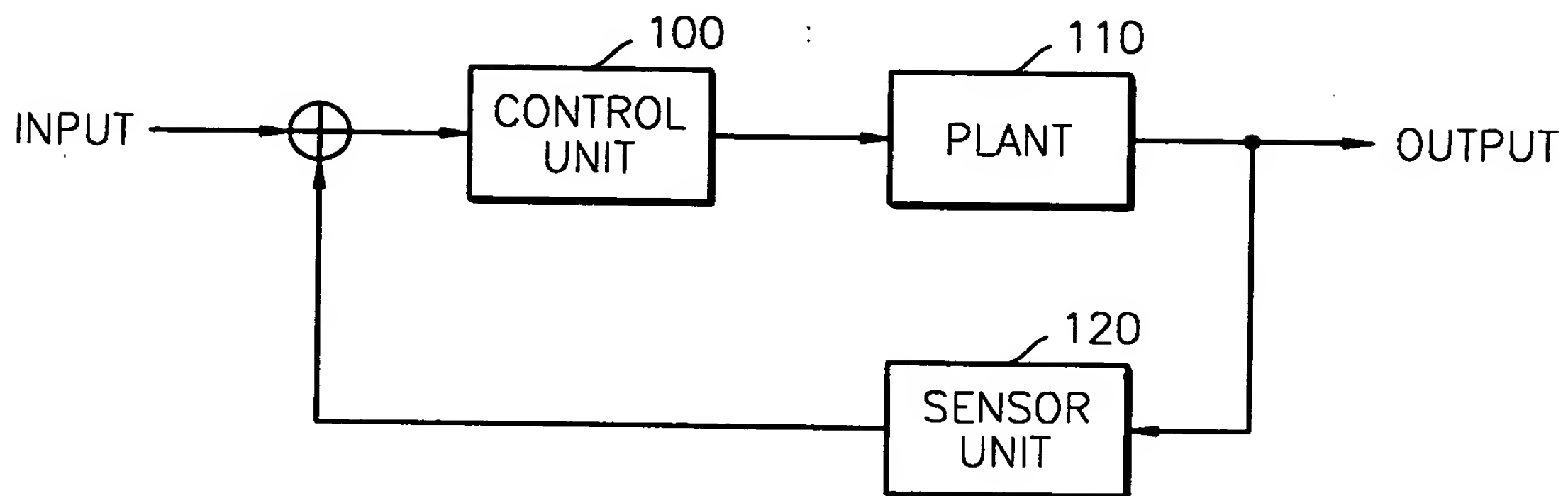


FIG. 2 (PRIOR ART)

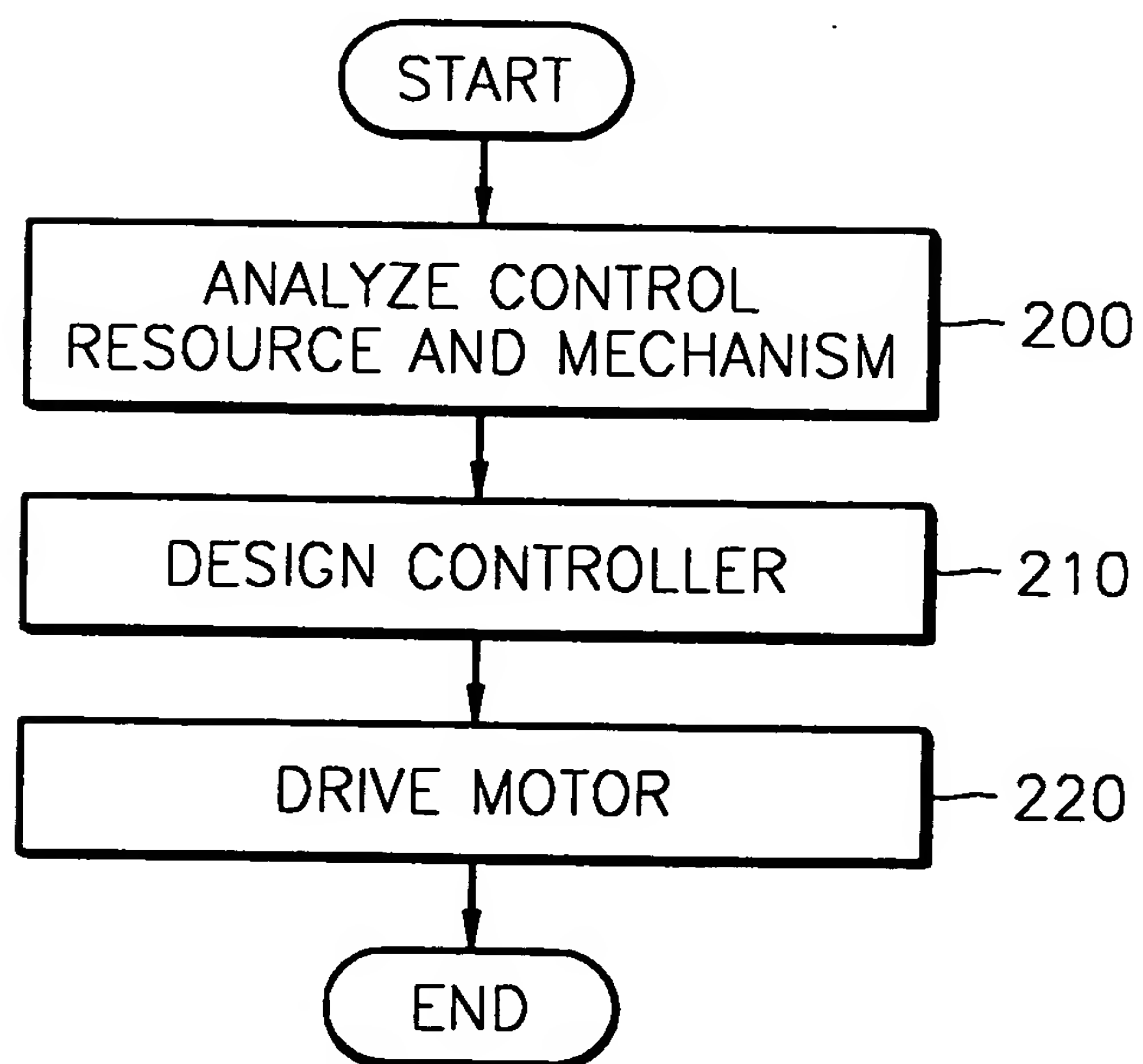


FIG. 3 (PRIOR ART)

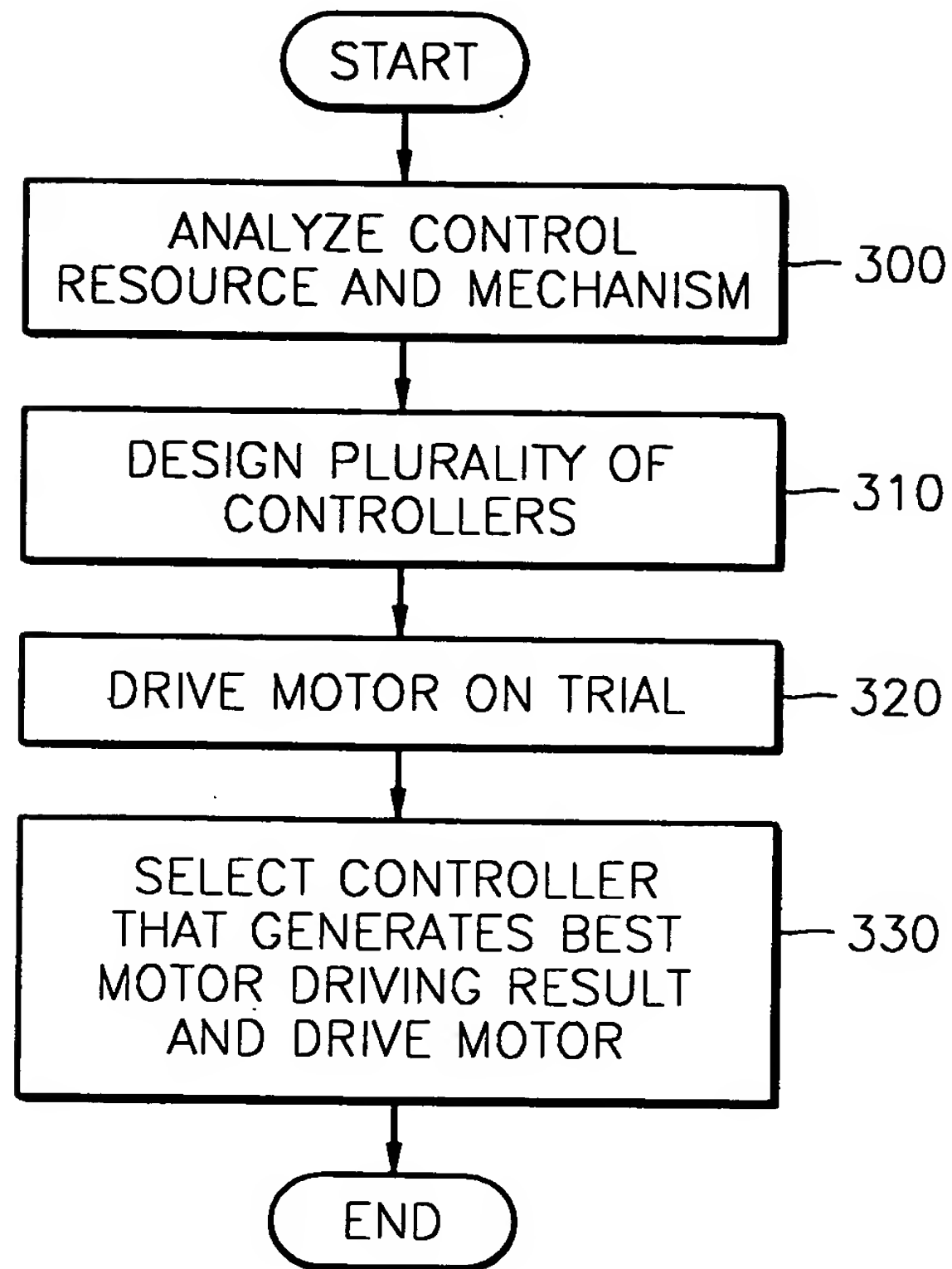


FIG. 4

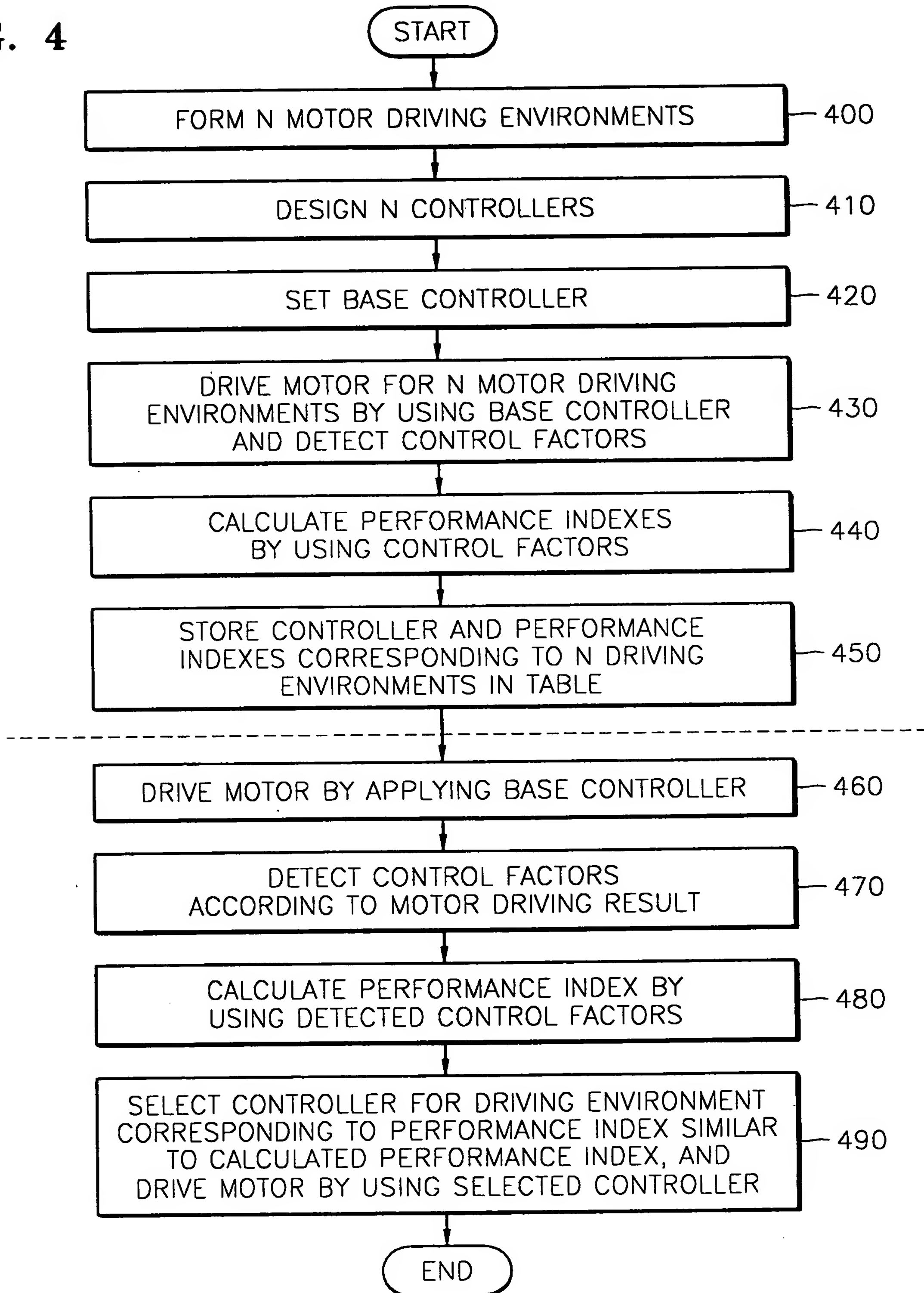


FIG. 5

EXAMPLE FOR FORMING PERFORMANCE
INDEXES FUNCTION

► SET MAIN CONTROL FACTORS

$x_1 = \text{Max. Overshoot}$

$x_2 = \text{Response Delay}$

$x_3 = \text{Velocity Ripple}$

500

► EVALUATE EACH CONTROL FACTOR TO COMBINE DIFFERENT
CONTROL FACTORS

510

Max. Overshoot		Response Delay		Velocity Ripple	
RANGE	x_{1_t}	RANGE	x_{2_t}	RANGE	x_{3_t}
>50%	1	>30msec	1	>4ips	1
>30%	2	>25msec	2	>3.5ips	2
>10%	3	>20msec	3	>3ips	3
⋮	⋮	⋮	⋮	⋮	⋮

► MAKE ORDER OF SELECTED CONTROL FACTORS
AND ASSIGN WEIGHTS TO PERFORMANCE INDEXES

(Max. Overshoot => A_{x1}

Response Delay => A_{x2}

Velocity Ripple => A_{x3})

520

► DESIGN PERFORMANCE INDEXES FUNCTION

$$y = (x_{1_t} \times A_{x1}) + (x_{2_t} \times A_{x2}) + (x_{3_t} \times A_{x3})$$

530

FIG. 6

PERFORMANCE INDEX TABLE:		
DRIVING ENVIRONMENT	CONTROLLER (PID)	PERFORMANCE INDEX
ENVIRONMENT A	K_{pA}, K_{iA}, K_{dA}	y_A
ENVIRONMENT B	K_{pB}, K_{iB}, K_{dB}	y_B
ENVIRONMENT C	K_{pC}, K_{iC}, K_{dC}	y_C
⋮	⋮	⋮